WE CLAIM:

1. A method for correcting and/or preventing an over-temperature condition in an auxiliary power unit comprising:

measuring an exhaust gas temperature of the auxiliary power unit;

comparing the exhaust gas temperature to a temperature trim limit;

calculating a fuel flow trim value;

subtracting the fuel flow trim value from a starting fuel flow value to get a trimmed commanded fuel flow value; and

delivering fuel to the auxiliary power unit at said trimmed commanded fuel flow value.

2. The method according to claim 1, wherein the method is used during starting of the auxiliary power unit.

3. The method according to claim 1, further comprising determining the starting fuel flow value based upon speed, air pressure and temperature of the auxiliary power unit.

4. The method according to claim 3, further comprising providing an upper limit at a predetermined maximum fuel schedule and a lower limit at a predetermined minimum fuel schedule for the starting fuel flow value.

5. The method according to claim 1, wherein the trimmed commanded fuel flow value is greater or equal to zero.

6. A method for correcting and/or preventing an over-temperature condition during starting of an auxiliary power unit of an aircraft comprising:

measuring an exhaust gas temperature of the auxiliary power unit;

comparing the exhaust gas temperature to a temperature trim limit;

calculating a fuel flow trim value;

determining a starting fuel flow value based upon speed, air pressure and temperature of the auxiliary power unit;

providing an upper limit at a predetermined maximum fuel schedule and a lower limit at a predetermined minimum fuel schedule for the starting fuel flow value;

subtracting the fuel flow trim value from the starting fuel flow value to get a trimmed commanded fuel flow value; and

delivering fuel to the auxiliary power unit at said trimmed commanded fuel flow value;

wherein the trimmed commanded fuel flow value is greater or equal to zero.

7. A method for correcting and/or preventing an overspeed condition in an auxiliary power unit comprising:

measuring the speed of the auxiliary power unit;

comparing the speed to a predetermined speed reference point to determine a speed error;

calculating a fuel flow trim value from the speed error;

subtracting the fuel flow trim value from a commanded fuel flow value to get a trimmed commanded fuel flow value; and

delivering fuel to the auxiliary power unit at said trimmed commanded fuel flow value.

8. The method according to claim 7, wherein the method is used during on-speed operation of the auxiliary power unit.

9. The method according to claim 7, further comprising:

determining a blowout prevention rate;

comparing the trimmed commanded fuel flow value to a predetermined minimum fuel schedule to determine a possibility of blowout at the trimmed commanded fuel flow value; and

providing fuel to the auxiliary power unit at the blowout prevention rate when the possibility of blowout is present, thereby preventing blowout of the auxiliary power unit.

10. The method according to claim 9, further comprising providing an upper limit on the fuel flow trim value at a predetermined maximum fuel schedule.

11. A method for correcting and/or preventing an overspeed condition during on-speed operation of an auxiliary power unit in an aircraft comprising:

measuring the speed of the auxiliary power unit;

comparing the speed to a predetermined speed reference point to determine a speed error;

calculating a fuel flow trim value from the speed error;

subtracting the fuel flow trim value from a commanded fuel flow value to get a trimmed commanded fuel flow value;

providing an upper limit on said the fuel flow trim value at a predetermined maximum fuel schedule;

determining a blowout prevention rate;

comparing the trimmed commanded fuel flow value to a predetermined minimum fuel schedule to determine a possibility of blowout at the trimmed commanded fuel flow value;

delivering fuel to the auxiliary power unit at the blowout prevention rate when the possibility of blowout is present, thereby preventing blowout of the auxiliary power unit; and

delivering fuel to the auxiliary power unit at said trimmed commanded fuel flow value when the possibility of blowout is not present.

12. A method for preventing and/or correcting undesired operating conditions of an auxiliary power unit comprising:

calculating an engine starting trimmed commanded fuel flow value by:

measuring an exhaust gas temperature of the auxiliary power unit;

comparing the exhaust gas temperature to a temperature trim limit;

calculating a fuel flow trim value;

subtracting the fuel flow trim value from a starting fuel flow value to get the engine starting trimmed commanded fuel flow value;

starting the auxiliary power unit with a fuel flow rate at the engine starting trimmed commanded fuel flow value;

calculating an on-speed trimmed commanded fuel flow value by:

measuring the speed of the auxiliary power unit,

comparing the speed to a predetermined speed reference point to determine a speed error,

calculating an on-speed fuel flow trim value from the speed error,

subtracting the on-speed fuel flow trim value from a commanded fuel flow value to get the on-speed trimmed commanded fuel flow value;

continuing the running of the auxiliary power unit with a fuel flow rate at the on-speed trimmed commanded fuel flow value.

13. The method according to claim 12, further comprising determining the starting fuel flow value based upon speed, air pressure and temperature of the auxiliary power unit.

14. The method according to claim 13, further comprising providing an upper limit at a predetermined maximum fuel schedule and a lower limit at a predetermined minimum fuel schedule for the starting fuel flow value.

15. The method according to claim 12, wherein the engine starting trimmed commanded fuel flow value is greater or equal to zero.

16. The method according to claim 12, further comprising:

determining an on-speed blowout prevention rate;

comparing the on-speed trimmed commanded fuel flow value to a predetermined on-speed minimum fuel schedule to determine a possibility of blowout at the on-speed trimmed commanded fuel flow value; and

providing fuel to the auxiliary power unit at the on-speed blowout prevention rate when the possibility of blowout is present, thereby preventing blowout of the auxiliary power unit.

17. The method according to claim 16, further comprising providing an upper limit on the on-speed fuel flow trim value at a predetermined maximum fuel schedule.

18. A fuel control logic for an auxiliary power unit comprising:

an over-temperature prevention and/or correcting mechanism to prevent an over-temperature condition from occurring during starting of the auxiliary power unit;

the over-temperature prevention and/or correcting mechanism operating by measuring an exhaust gas temperature of the auxiliary power unit, comparing the exhaust gas temperature to a temperature trim limit, calculating a fuel flow trim value, subtracting the fuel flow trim value from a starting fuel flow value to get a trimmed commanded fuel flow value, and delivering fuel to the auxiliary power unit at said trimmed commanded fuel flow value.

19. The fuel control logic according to claim 18, wherein the over-temperature prevention and/or correcting mechanism further operates by determining the starting fuel flow value based upon speed, air pressure and temperature of the auxiliary power unit; and providing an upper limit at a predetermined maximum fuel schedule and a lower limit at a predetermined minimum fuel schedule for the starting fuel flow value.

20. The fuel control logic according to claim 18, wherein the trimmed commanded fuel flow may be zero.

21. The fuel control logic according to claim 18, further comprising:

an overspeed prevention and/or correcting mechanism to prevent an overspeed condition from occurring during on-speed operation of the auxiliary power unit;

the overspeed prevention and/or correcting mechanism operating by measuring the speed of the auxiliary power unit, comparing the speed to a predetermined speed reference point to determine a speed error, calculating an

on-speed fuel flow trim value from the speed error, subtracting the on-speed fuel flow trim value from an on-speed commanded fuel flow value to get an on-speed trimmed commanded fuel flow value, and delivering fuel to the auxiliary power unit at said on-speed trimmed commanded fuel flow value.

22. The fuel control logic according to claim 21, wherein the overspeed prevention and/or correcting mechanism further operates by determining a blowout prevention rate, comparing the on-speed trimmed commanded fuel flow value to a predetermined minimum fuel schedule to determine a possibility of blowout at the on-speed trimmed commanded fuel flow value, and providing fuel to the auxiliary power unit at the blowout prevention rate when the possibility of blowout is present, thereby preventing blowout of the auxiliary power unit.

23. The fuel control logic according to claim 22, wherein the overspeed prevention and/or correcting mechanism further operates by providing an upper limit on the on-speed fuel flow trim value at a predetermined maximum fuel schedule.

24. An auxiliary power unit for an aircraft comprising:

an air inlet;

a compressor in flow arrangement with the air inlet;

a bleed port for providing compressed air to the aircraft;

a combustor having at least one fuel nozzle;

a turbine in flow arrangement with a gas exhaust;

a fuel control logic having an over-temperature prevention and/or correcting mechanism to prevent an over-temperature condition from occurring during starting of the auxiliary power unit; and the over-temperature prevention and/or correcting mechanism operating by measuring an exhaust gas

temperature of the auxiliary power unit, comparing the exhaust gas temperature to a temperature trim limit, calculating a fuel flow trim value, subtracting the fuel flow trim value from a starting fuel flow value to get a trimmed commanded fuel flow value, and delivering fuel to the auxiliary power unit at said trimmed commanded fuel flow value.

25. The auxiliary power unit according to claim 24, further comprising:

an overspeed prevention and/or correcting mechanism to prevent an overspeed condition from occurring during on-speed operation of the auxiliary power unit;

the overspeed prevention and/or correcting mechanism operating by measuring the speed of the auxiliary power unit, comparing the speed to a predetermined speed reference point to determine a speed error, calculating an on-speed fuel flow trim value from the speed error, subtracting the on-speed fuel flow trim value from an on-speed commanded fuel flow value to get an on-speed trimmed commanded fuel flow value, and delivering fuel to the auxiliary power unit at said on-speed trimmed commanded fuel flow value.